TechEdSat

Completed Technology Project (2011 - 2012)

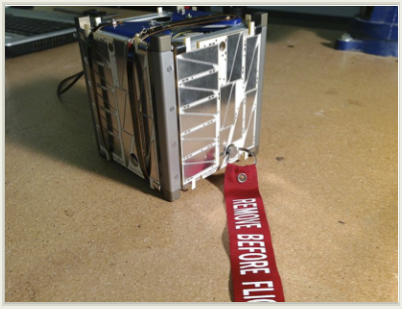
Project Introduction

TechEdSat is a 1U CubeSat built by San Jose State University in partnership with NASA Ames Research Center and AAC Microtec. Its mission is to evaluate Space Plug-and-play Avionics (SPA) designed in Sweden by AAC Microtec, and to perform a communications experiment utilizing the Iridium and Orbcomm satellite phone network. TechEdSat will be launched to the International Space Station aboard HTV-3 on 21 July 2012. From there, it will be deployed into Low Earth Orbit using the JAXA J-SSOD deployer, from the JEM.

The overall goal of the Technical Education Satellite (TechEdSat) is to employ a small spacecraft to evaluate, demonstrate, and validate two new technologies for future experiments aboard small space satellites and other small payload systems. Both technologies were initially developed with NASA's Innovative Partnerships Programs (IPPs). The first technology is the AAC's Plug-and-Play power architecture, the goal of which is rapid configuration of nanosatellite avionics components. The second technology is use of two communications satellite constellations, Iridium and Orbcomm, for two way communication with mission operations on Earth. To evaluate these technologies, San Jose State University students will develop, build, test, and flight qualify a CubeSat for deployment from the International Space Station. Qualification and development of the CubeSat will be overseen by assigned NASA Ames Research Center mentors from the Office of the Chief Technologist. The satellite will be launched from International Space Station (ISS) on August 26th, 2012. It will be inserted into an orbit at 413.2 km apogee and 381.3 km perigee, on an inclination from the equator of 51.6° degrees. Amateur band beacon transmission will begin forty minutes after launch from ISS. The experiment will complete and all communications will be shut down 10 days after launch from ISS. The downward and retrograde release vector will slow the satellite and reduce the altitude of the orbit, until de-orbiting occurs 105 days after launch. The spacecraft is a single CubeSat unit 10 cm X 10 cm X 10 cm. The total mass is about 1.33 kg.

Anticipated Benefits

Anticipated Benefit to NASA for Funded Missions: The primary benefit to NASA, specifically for small satellites, is to have a standardized interface for avionics, sensors, and hardware. Another benefit is to have a more effective communications interface utilizing the Iridium and Orbcomm satellites. Finally, the ability to be able to deploy satellites from the ISS provides for a new access-to-space capability. This type of technology could be used for the EDSN Satellite.



Project Image TechEdSat

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Center Innovation Fund

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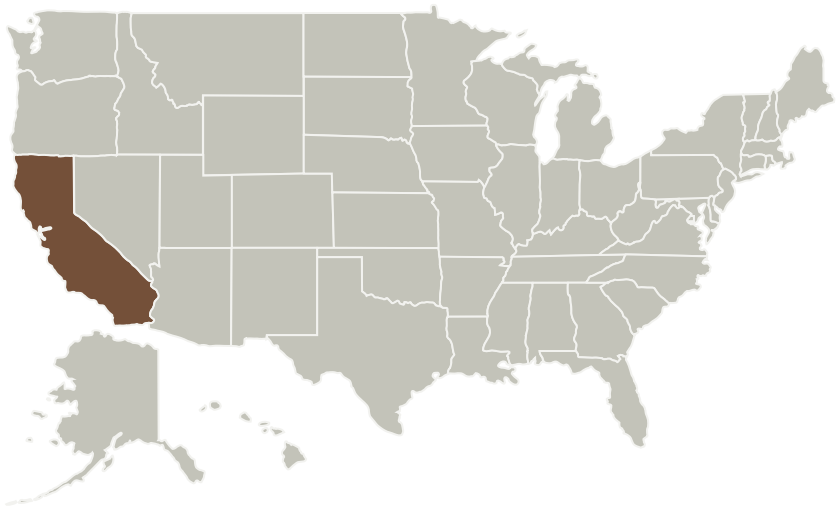
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
San Jose State University	Supporting Organization	Academia	San Jose, California
Universities Space Research Association(USRA)	Supporting Organization	R&D Center	Huntsville, Alabama

Primary U.S. Work Locations
California

Project Management

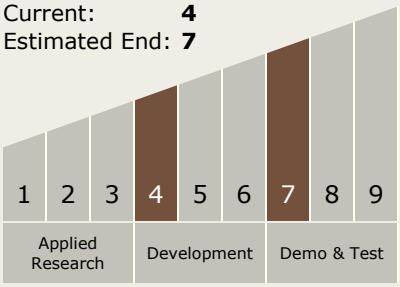
Program Director:
Michael R Lapointe

Project Manager:
Andres Martinez

Principal Investigator:
Marcus S Murbach

Technology Maturity (TRL)

Start: **4**
Current: **4**
Estimated End: **7**

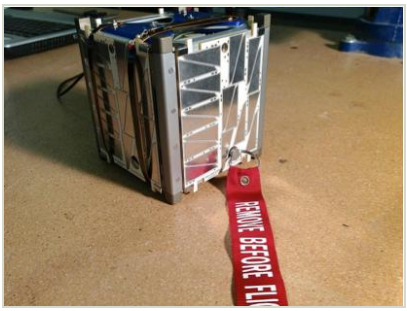


Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.3 Internetworking
    - TX05.3.1 Disruption Tolerant Networking

Images



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Project Image TechEdSat
(https://techport.nasa.gov/image/1381)